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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/698,994 | 10/31/2003 | Naoshige Itami | 3408.68664 | 8859 |
| 24978 7590 04/05/2007 GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606 | | | EXAMINER VU, PHU | |
| | | | ART UNIT 2871 | PAPER NUMBER |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 04/05/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/698,994

Applicant(s)

ITAMI ET AL.

Examiner

Phu Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/29/2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 14-18 is/are pending in the application.
- 4a) Of the above claim(s) 10-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 14-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2/15/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks, filed 12/29/2006, with respect to the rejection(s) of claim(s) claims 1-9 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Tsuda.

Applicant's arguments filed 12/29/2006 have been fully considered but they are not persuasive, regarding claims 14-17.

Applicant has previously argued that the references of record did not teach generating a difference in thermal shrinkage between the surface portion and the layer portion other than the surface portion" and "then performing a heat treatment to said resin layer to form random wrinkles of micro-grooves in said surface portion." Tsuda meets this limitation as Tsuda teaches reforming a surface portion of the photosensitive resin only as the entire layer is not exposed at portions where there is photoresist is at the lower portions.

For instance Tsuda uses a mask whereas the prior art does not however there is no limitations in the claim that explicitly claim that the selective reformation irradiation step occurs without the presence of a mask or a limitation that the photosensitive resin layer is flat following the application of energy step and prior to the heating treatment step which would show an unambiguous difference between the 2 procedures.

Applicant has argued differences between the current invention and that of the prior art but it is not apparent that these differences are claimed regarding claims 14-17.

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For instance Tsuda uses a mask whereas the prior art does not however there is no limitations in the claim that explicitly claim that the selective reformation irradiation step occurs without the presence of a mask or a limitation that the photosensitive resin layer is flat following the application of energy step and prior to the heating treatment step. It appears that any process where the exposure step does not completely dissolve the photosensitive layer will meet that limitation as only the top part of the resin layer can be exposed to light whereas the bottom portion will always remain undeveloped if the layer is not exposed all the way through. A limitation of resin layer is flat following the application of energy step and prior to the heating treatment step would distinguish between the two processes.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 3 and 9 are rejected under 35 U.S.C. 103(a) as being anticipated by Tsuda et al US Patent No 7106400.

Regarding claim 1, Tsuda teaches a method of manufacturing a substrate for a liquid crystal display device comprising the steps of forming a resin layer on a substrate (fig. 3A) selectively reforming the surface portion of the resin layer by applying energy

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with an energy per unit time of a prescribed value or more to said resin layer to generate a thermal shrinkage between said surface portion and the layer portion other than the surface portion in the resin layer wherein the energy-applied results in a difference in thermal shrinkage however this is a property as a direct result of partially curing (fig. 3B and 3C); performing a heat treatment (3E) to said layer to form random wrinkles of micro-grooves in said surface portion, and forming reflective electrodes (3G) on the surface portion.

Regarding claim 9, the reference teaches a liquid crystal display in which a pair of substrates are manufactured and the substrates are mutually stuck together so that liquid crystal is sealed between the substrates (see column 2 lines 27-32).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda in view of Ichimura et al US Patent No 6327009.

Regarding claims, 2-4, Tsuda teaches all the limitations of claims 2-4 except the UV curing energy applied exceeding 12 mW/cm². Ichimura discloses a process of

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curing a photosensitive resin by heating and partially curing the uses UV light exceeding $12\text{mW}/\text{cm}^2$ to create a display with improved visibility (see column 2 lines 58-65 and column 5 lines 25-60). Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a UV curing process exceeding $12\text{mW}/\text{cm}^2$ to create a display with improved visibility.

Regarding claim 7 with respect to claims 1-4, Tsuda teaches use of a photosensitive resin (see column 2 lines 32-35).

Regarding claim 8 with respect to claims 1-4, Tsuda discloses all the limitations of claim 8 except the photosensitive resin is a novolac resist. Ichiumura discloses novolac as a commercially available resin (see column 8 lines 4-14). Therefore, it would have been obvious to one of ordinary skill in the art to use novolac as it is readily available photosensitive resin.

Regarding claim 9 with respect to claims 3-4, Tsuda teaches a liquid crystal display in which a pair of substrates are manufactured and the substrates are mutually stuck together so that liquid crystal is sealed between the substrates (see column 2 lines 27-32).

Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda in view of Codama US Patent no 6339291.

Regarding claims 5-6 and claim 8 with respect to claims 5 and 6, Tsuda discloses all the limitations of claims 5 and 6 except irradiation of ultraviolet rays with an illumination below $12\text{mW}/\text{cm}^2$ of a novolac resin layer in a semi-hardened condition prior to application of energy and wherein the heat treatment of the resin layer is

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performed at a prescribed temperature prior to application of energy. Codama teaches a semi-hardened novolac resin wherein energy is applied at a rate of 10 mW/cm^2 wherein the resin layer is semi-hardened prior to the application energy through heat treatment a prescribed temperature that undergoes little shrinkage during curing (see column 8 lines 6-11 and 60-67 and 9 lines 1-6). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a novolac resin wherein energy is applied at a rate of 10 mW/cm^2 to a semi-hardened resin layer to reduce shrinkage during curing. While Codama's invention pertains to a organic EL device Codama also states that these features are applicable to liquid crystal technology (see column 12 line 10-11).

Regarding claim 7 with respect to claims 5-6, Kim teaches use of a photosensitive resin (see column 3 lines 45-57).

Regarding claim 9 with respect to claims 5-6, Kim teaches a liquid crystal display in, which a pair of substrates are manufactured and the substrates are mutually stuck together so that liquid crystal is sealed between the substrates (see figure 2).

Claims 14-17 are rejected under 35 U.S.C. 103(a) as being obvious over Ichimura US 6181397 in view of Yoshii 20020030774.

Regarding claim 14, Ichimura teaches a method of manufacturing a substrate for a liquid crystal display device comprising the steps of: forming a resin layer on a substrate (fig. 3 element 12), selectively reforming the surface portion of the resin layer by applying energy and energy density per unit time of a prescribed value or more to

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said resin layer without using a mask to generate a difference in a rate of thermal shrinkage between said surface portion and the other layer portion other than the surface portion in said resin layer (see fig. 3C), and performing heat treatment (column 9 line 51) on the resin layer to form wrinkles of micro-grooves in said surface portion; and forming reflective electrodes on said surface portion (13a). The reference fails to teach the wrinkles of micro-grooves being random however, Yoshi teaches a reflective layer formed by using a similar process that forms random wrinkles of micro-grooves (see fig. 8 and fig. 10) that provides high reflectance over a wide angle ([0015]) therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to form random wrinkles of micro-grooves to gain high reflectance over wide angles.

Regarding claims 15-17, the reference teaches the application of energy is performed by ultraviolet light exceeding 12 mw/cm^2 (column 9 lines 40-45).

Claim 18 is rejected under 35 U.S.C. 103(a) as being obvious over Ichimura in view of Yoshii and further view of Codama US Patent no 6339291.

Regarding claim 18 except irradiation of ultraviolet rays with an illumination below 12 mW/cm^2 of the photoresist in a semi-hardened condition prior to application of energy and wherein the heat treatment of the resin layer is performed at a prescribed temperature prior to application of energy. Codama teaches a semi-hardened novolac resin wherein energy is applied at a rate of 10 mW/cm^2 wherein the resin layer is semi-hardened prior to the application energy through heat treatment a prescribed temperature that undergoes little shrinkage during curing (see column 8 lines 6-11 and

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60-67 and 9 lines 1-6). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a novolac resin wherein energy is applied at a rate of 10 mW/cm^2 to a semi-hardened resin layer to reduce shrinkage during curing. While Codama's invention pertains to a organic EL device Codama also states that these features are applicable to liquid crystal technology (see column 12 line 10-11).

Conclusion

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571)-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu
Examiner
AU 2871


ANDREW SCHECHTER
PRIMARY EXAMINER